

IN THE CLAIMS:

This listing of the claims replaces all other listing of claims. Please cancel claims 2, 8-11, and 19-21, and amend claims 1, 3-7, 13-18 as follows:

1. (Currently Amended) An apparatus to measure micro-forces, comprising:
a cantilever palette including a plurality of cantilever array blocks, each cantilever array block including a plurality of cantilevers, each cantilever including a plurality of cantilever fingers surrounded by a frame with frame fingers, the said cantilever fingers and the said frame fingers forming a diffraction grating, each cantilever array block being configured to be responsive to a chemical-mechanical force created by presence of a predetermined substance upon exposing the cantilevers in the cantilever array block to the substance predetermined micro-force, such that cantilevers of the said cantilever array block deflect in the presence of the said predetermined micro-force substance, causing the said diffraction grating to diffract light and thereby provide visual indicia a change in a diffraction pattern or color of the diffracted light, as a visual indication of the presence of the substance, and wherein the apparatus does not require external power said predetermined micro-force.

Claim 2 Canceled

3. (Currently Amended) The apparatus of claim 2 wherein the said predetermined micro-force is a chemical-mechanical force is created by the presence of a predetermined chemical.

4. (Currently Amended) The apparatus of claim 1 wherein the said predetermined micro-force is a chemical-mechanical force created by an antibody-antigen interaction.

5. (Currently Amended) The apparatus of claim 2 wherein each cantilever array block of the said plurality of cantilever array blocks is configured to be responsive to a different predetermined substance.

6. (Currently Amended) The apparatus of claim 2 wherein each cantilever array block of the said plurality of cantilever array blocks is configured to be responsive to a predetermined level of a single predetermined substance.

7. (Currently Amended) The apparatus of claim 2 wherein the said plurality of cantilever array blocks includes cantilever array block subsets, each cantilever array block subset being configured to be responsive to a different predetermined substance, and each cantilever array block within each cantilever array block subset being configured to be responsive to a predetermined level of the said predetermined substance.

Claims 8-11 Canceled

12. (Original) The apparatus of claim 1 further comprising image enhancement devices selected from the group consisting of: a beam splitter, a visible lens, and a spatial filter.

13. (Currently Amended) The apparatus of claim 1 further comprising a pin hole array attached to the said cantilever palette.

14. (Currently Amended) A method of identifying the presence of a substance micro-forces, the said-method comprising the steps of:

forming a cantilever palette including a plurality of cantilever array blocks, each cantilever array block including a plurality of cantilevers, each cantilever including a plurality of cantilever fingers surrounded by a frame with frame fingers, the said-cantilever fingers and the said-frame fingers forming a diffraction grating, each cantilever array block being configured to be responsive to a predetermined chemical-mechanical micro-force created by the presence of a predetermined substance;

exposing the said-cantilever palette to a substance said predetermined micro-force, thereby causing cantilevers of the said-cantilever array block to deflect such that the said diffraction grating produces diffracted light; and visually observing the said-diffracted light

from the said diffraction grating to identify the presence of the substance said predetermined micro-force.

Claim 15 Canceled

16. (Currently Amended) The method of claim 15 wherein the said forming step includes the step of forming each cantilever array block of the said plurality of cantilever array blocks to be responsive to a different predetermined substance.

17. (Currently Amended) The method of claim 15 wherein the said forming step includes the step of forming each cantilever array block of the said plurality of cantilever array blocks to be responsive to a predetermined level of a single predetermined substance.

18. (Currently Amended) The method of claim 15 wherein the said forming step includes the step of forming cantilever array block subsets, each cantilever array block subset being configured to be responsive to a different predetermined substance, and each cantilever array block within each cantilever array block subset being configured to be responsive to a predetermined level of the said predetermined substance.

Claims 19-21 Canceled

22. (New) The apparatus of claim 1, wherein the cantilever fingers deflect from an initial position with respect to the frame fingers to alter the diffraction grating, due to exposure with the predetermined substance.

23. (New) The apparatus of claim 22, wherein cantilevers fingers comprise a material which preferentially binds to the predetermined substance.

24. (New) The apparatus of claim 23, wherein the material comprises monoclonal antibody and the predetermined substance comprises an antigen, wherein the

monoclonal antibody binds to the antigen and the cantilever fingers deflect in the presence of the antigen.

25. (New) The method of claim 14, wherein observing the diffracted light in the test environment further comprises comparing diffraction of incident light prior to and after exposing the cantilever palette to the test environment.

26. (New) The method of claim 25, wherein:

exposing the cantilever palette to the test environment further includes exposing the cantilever palette to incident white light;

exposing the cantilever palette to the test environment is further exposing the cantilever palette having cantilever fingers comprising a micro-force creating material which is a predetermined binding reagent capable of binding to a predetermined chemical substance; and

visually observing the diffracted light comprises visually observing the diffracted light for a change in color, pattern, or intensity to determine if the predetermined substance is preferentially bound to the cantilevers to identify the physical property which is at least one of the presence of the predetermined chemical substance and level of the predetermined substance.

27. (New) The method of claim 26, wherein providing a cantilever palette further includes providing cantilever fingers comprising a binding reagent which is a biomolecule which preferentially binds to the predetermined chemical substance.

28. (New) The method of claim 27, wherein providing cantilever fingers comprising a biomolecule further includes providing cantilever fingers comprising a monoclonal antibody, the predetermined chemical substance comprising an antigen that binds to the monoclonal antibody, wherein the cantilever fingers deflect in response to a micro-force created by binding of the antigen.

29. (New) The method of claim 14, wherein observing the diffracted light in the test environment further comprises comparing diffraction of incident light after exposing the cantilever palette to the test environment and a control environment.

30. (New) An apparatus to detect a substance in an environment, comprising:
a cantilever array block, the cantilever array block including a plurality of cantilevers having a plurality of cantilever fingers surrounded by a frame with frame fingers, the cantilever fingers and frame fingers forming a diffraction grating, the cantilever array block having the cantilever comprising a substrate material and a material which is predetermined to respond to the substance, such that cantilevers of the cantilever array block deflect in a presence of a predetermined micro-force, causing the diffraction grating to diffract light and thereby provide visual indicia of the physical property.

31. (New) The apparatus of claim 30, wherein the visual indicia of the diffraction grating are selected from a group of changes in diffraction consisting of changes in color, changes in intensity, and changes in pattern of the diffracted light.

32. (New) An apparatus to measure a chemical-mechanical micro-force, comprising:

a cantilever palette including at least one cantilever array block, the at least one cantilever array block including a plurality of cantilevers with cantilever fingers, the cantilever fingers surrounded by a frame with frame fingers, the cantilever fingers and the frame fingers forming a diffraction grating, wherein the cantilever fingers comprise a micro-force creating material which is a binding reagent, such that in a presence of a ligand of the binding reagent, a chemical-mechanical micro-force is created and the cantilever fingers deflect, causing the diffraction grating to diffract light and thereby provide visual indications of a presence of the chemical-mechanical micro-force, wherein the apparatus does not require external power.

33. (New) A sensor for a physical property, the sensor comprising:
a first cantilever array including a plurality of first cantilever fingers, each first

cantilever finger including a force-creating material, such that the force-creating material causes the first cantilever fingers to bend in a presence of the substance;

a second cantilever array including a plurality of second cantilever fingers, the first and second cantilever arrays being disposed with respect to each other such that the first cantilever fingers are interleaved with the second cantilever fingers; wherein

the first and second cantilever fingers forming a diffraction grating having an effect on the light from a light source, wherein the effect of the diffraction grating on the light varies as the first cantilevers bend, such that the variation of the effect corresponds to a variation in the presence of the substance, wherein the apparatus does not require external power.

34. (New) A sensor according to claim 33, wherein the force-creating material is mounted on a surface of each of the first cantilever fingers and binds the predetermined substance to the surface so as to cause each of the first cantilever fingers to bend.

35. (New) A sensor according to claim 33, wherein the light source is incident light.